ATLAS 4 – operational for a year

Haleakala, Hawaii

Maunaloa, Hawaii

Sutherland, South Africa

El Sauce, Chile

ATLAS 3 – now operational!

Haleakala, Hawaii

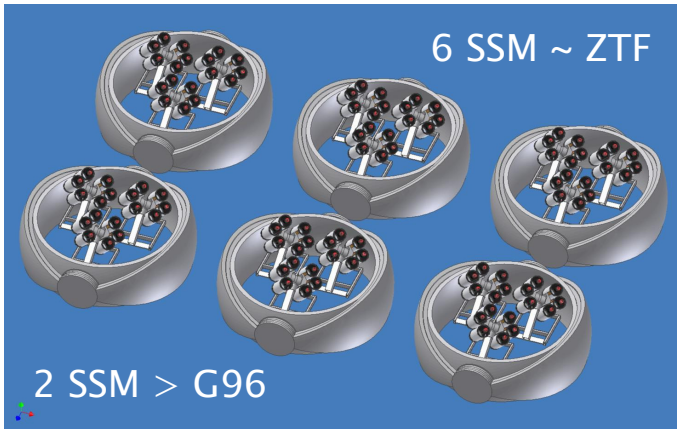
Maunaloa, Hawaii

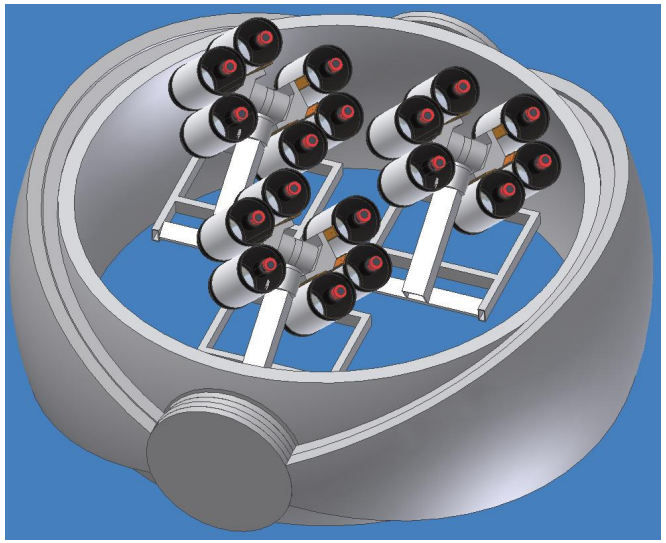
Sutherland, South Africa

El Sauce, Chile

ATLAS 5 (Tenerife), Sky Survey Module?

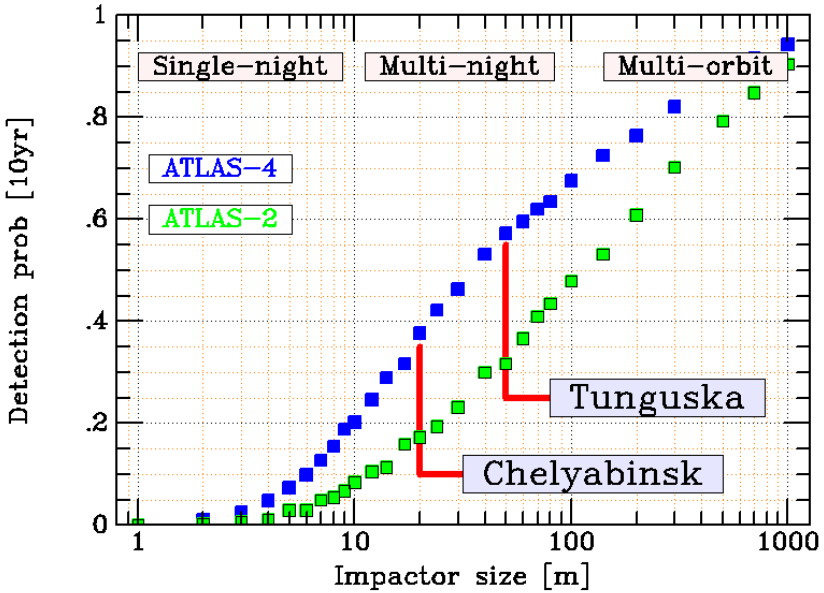
- ATLAS 5 comes online this year (talk by Javier Licandro)
  - Funded by EU/IAC (not NASA) but will integrate with the rest of ATLAS
  - Newer technology: Celestron RASA-11, Sony IMX455 (QHY, ZWO, etc)
  - Performance is as expected (good psf, photon limited)
  - Many new opportunities for flexible sky surveys!
- We can build a very cost effective Sky Survey Module
  - ATLAS costs ~\$150k/(m^2deg^2), ZTF is ~\$800k/(m^2deg^2)
  - Newer telescope and detectors with a well chosen mount and enclosure could be ~\$50k/(m^2deg^2) (complete, on sky).
  - A 6 telescope SSM could cost as little as \$150k (in quantity)
  - Solar power and Starlink could make a system completely independent of site restrictions.
  - Should we? Is there any demand for this?



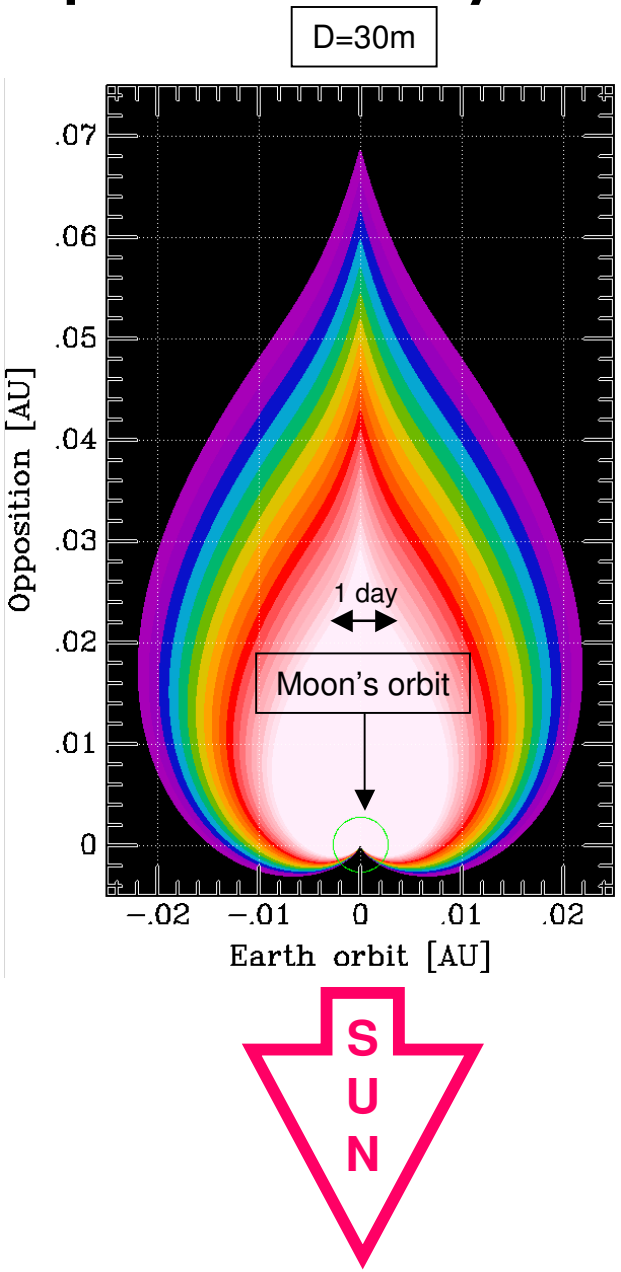


ATLAS impactor detection probability

- 2018 LA (~3m): ATLAS detection
- 2019 MO (~5m): ATLAS detection
- 2023 DZ2 (~50m): as expected
  - ATLAS first detection at t_0 – 11 days
  - ATLAS first solid tracklet at t_0 – 8days

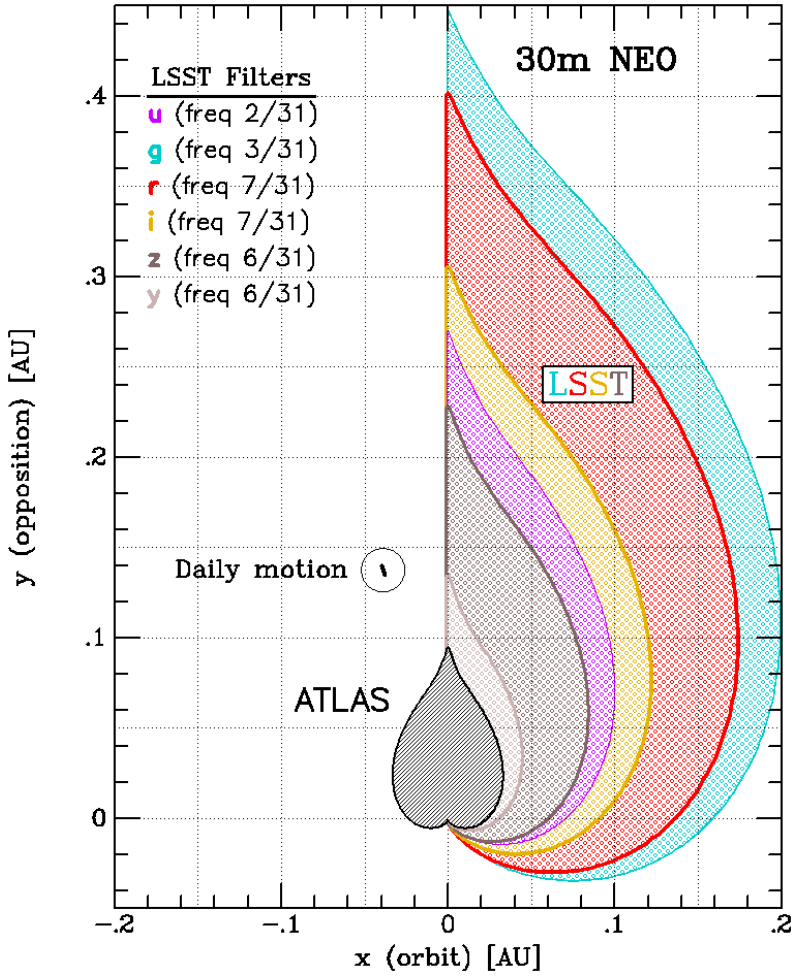


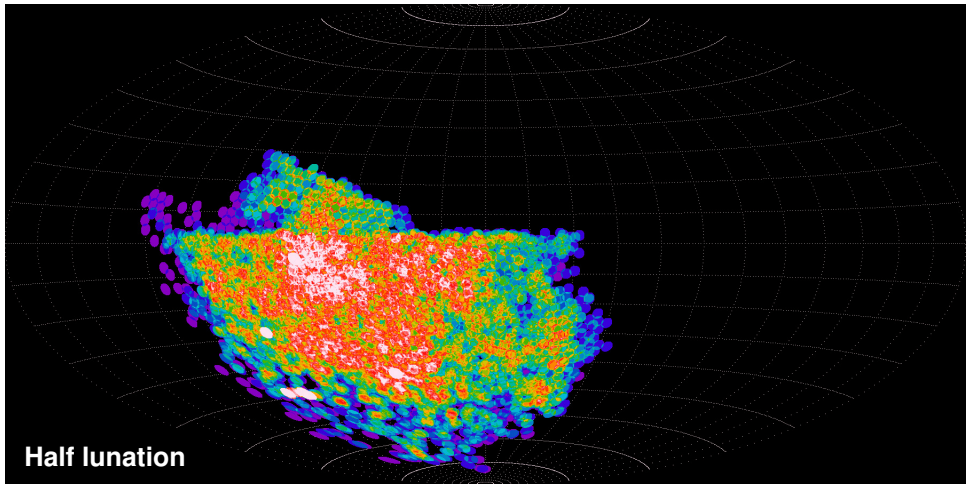
MOSS simulation



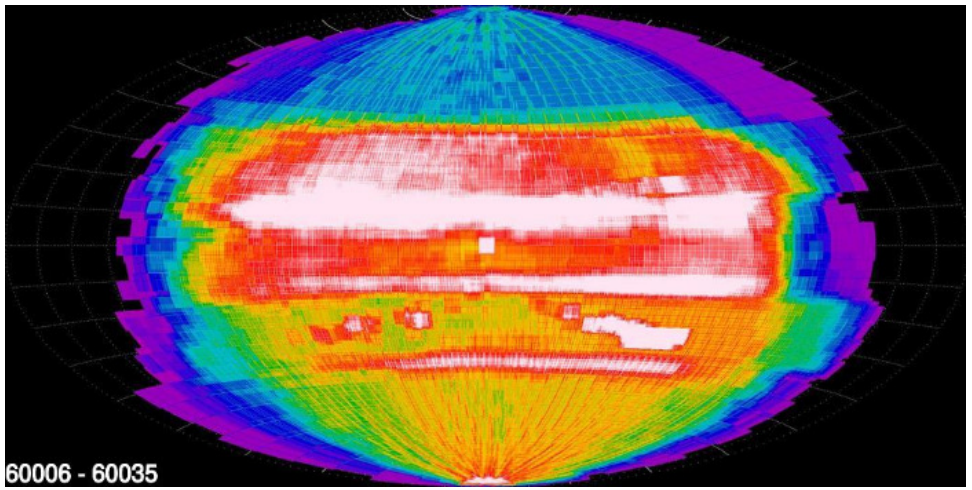
ATLAS in the LSST era

- LSST should increase NEO discovery rate by at least x10, but will have shortcomings for warning of imminent impact.





LSST: 8,000 deg^2 every other day, mixed filters limit depth



ATLAS: 32,000 deg^2 every other day

PDC 2304

Next steps for ATLAS

- Get Maunaloa back online!
- New linking software
  - Multiple sites, inter-day linkage: our existing approaches are just not good enough. (ATLAS loses fast NEOs, possible impacts, because limited followup west of Hawaii with adequate field of view.)
  - ATLAS "puma" code developed is a fast (millisec) orbit fitter, "pumalink" is a fast, inter-site, inter-day linker that functions well at ranges of 0.02 AU.
- New scheduler
  - Multiple sites, overlapping observations: we need more flexibility!
  - We need to feed back observation status to the scheduler!
- Quadruple exposure time
  - m_{lim}~19.7 $\rightarrow$ 20.5 at the cost of triples every other day instead of quads every day
  - Better SNR converts possible quads to certain triples (possibly streaked)
  - This nearly doubles the warning time for imminent impact
- The ATLAS website is fallingstar.com
  - Watch our real time operations dashboard: http://dashboard.fallingstar.com/md